SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS

RELATED TO AMENDMENT NO. 1 TO THE COMBINED LICENSE NO. NPF-91

AND LICENSE NO. NPF-92

SOUTHERN NUCLEAR OPERATING COMPANY, INC.

GEORGIA POWER COMPANY

OGLETHORPE POWER COMPANY

MUNICIPAL ELECTRIC AUTHORITY OF GEORGIA

CITY OF DALTON, GEORGIA

VOGTLE ELECTRIC GENERATING PLANT UNITS 3 AND 4

DOCKET NOS. 52-025 AND 52-026

1.0 INTRODUCTION

By letter dated August 1, 2012, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12215A084), Southern Nuclear Operating Company (SNC-Licensee) requested that the U.S. Nuclear Regulatory Commission (NRC) amend the combined licenses (COLs) for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, COL Numbers NPF-91 and NPF-92, respectively. The proposed amendment would depart from the VEGP Units 3 and 4 plant-specific design control document (DCD) Tier 2* information by revising the details associated with the nuclear island basemat concrete and reinforcement bar.

The requested departure would increase the concrete specified compressive strength for the nuclear island basemat (the nominal 6-foot-thick, cast-in-place, reinforced-concrete foundation for the nuclear island structures, consisting of containment, shield building, and auxiliary building) and remove a reinforcement design detail. SNC states that the requested departures are necessary to address American Concrete Institute (ACI) 349-01, “Code Requirements for Nuclear Safety-Related Concrete Structures,” which requires development length of the reinforcement bar in the nominal 6-foot-thick portion of the nuclear island basemat. The description of the basemat concrete in the updated final safety analysis report (UFSAR) Subsection 3.8.4.6.1.1 as having a specified compressive strength of 4,000 pounds per square inch (psi) is proposed to be revised to require a 5,000 psi specified compressive strength for the basemat under the nuclear island. In addition, SNC proposes to revise UFSAR Figure 3H.5-3 by removing the dimension labelled as 0 inches in the portion of the figure showing the junction of the basemat and exterior nuclear island wall.

2.0 REGULATORY EVALUATION

The basemat and nuclear island structures are required to comply with the provisions of ACI 349-01 and supplementary requirements included in UFSAR Sections 3.7 and 3.8. The proposed changes to the concrete and rebar detail design and the UFSAR description are required to be consistent with ACI 349-01 and other supplementary UFSAR requirements.

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, “Domestic Licensing of Production and Utilization Facilities,” Appendix A, “General Design Criteria for Nuclear Power Plants,” General Design Criterion (GDC) 1, “Quality Standards and Records,” requires that structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of safety functions to be performed.

10 CFR Part 50, Appendix A, GDC 2, “Design Bases for Protection Against Natural Phenomena,” requires that structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions.

10 CFR Part 50, Appendix A, GDC 4, “Environmental and Dynamic Effects Design Basis,” requires that structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-cooling accidents.

10 CFR Part 50, Appendix S, “Earthquake Engineering Criteria for Nuclear Power Plants,” requires nuclear power plants to be designed so that, if safe-shutdown earthquake (SSE) ground motion occurs, certain structures, systems, and components will remain functional and within applicable stress, strain, and deformation limits. The required safety functions of structures, systems, and components must be assured during and after the vibratory ground motion associated with the SSE ground motion through design, testing, or qualification methods.

Appendix D, “Design Certification Rule for the AP1000 Design,” of 10 CFR Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants,” Section VIII.B.6 requires NRC approval for departures from Tier 2* information. The proposed amendment request does involve changes to Tier 2* information. Therefore, NRC approval is required before making the Tier 2* changes addressed in this departure.

3.0 TECHNICAL EVALUATION

To perform the technical evaluation, the NRC staff considered Vogtle UFSAR Sections 3.7, “Seismic Design,” and 3.8, “Design of Category I Structures.” The staff also examined the portions of NUREG–1793, Supplement 2, “Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design” (ADAMS Accession No. ML112061231), and “Final Safety Evaluation Report for the Vogtle Electric Generating Plant Units 3 & 4 Combined License Application” (ADAMS Accession No. ML110450302) documenting the staff’s technical evaluation of those aspects of the AP1000 DCD and Vogtle COL application, respectively. The staff reviewed the license amendment request (LAR) to evaluate the impact of the requested UFSAR changes on the stability and safety of foundations and structures to be constructed on the Vogtle site.

Under the LAR, the licensee proposed to depart from the plant-specific DCD Tier 2* information by increasing the concrete compressive strength for the nuclear island basemat from 4,000 psi (27.6 megapascals (MPa)) to 5,000 psi (34.5 MPa). Specifically, the LAR will amend UFSAR Subsection 3.8.4.6.1.1 (Tier 2* is bracketed) to state:

> [*The compressive strength of concrete used in seismic Category I structures and containment internal structures is* f'_c *= 4,000 psi except as noted in the following. For the nuclear island basemat (the nominal 6 ft. thick foundation described in Subsection 3.8.5.1) the compressive strength of concrete is* f'_c *= 5,000 psi. For the SC composite portion of the shield building structure including the connection region below the SC/RC interface and the shield building roof, the compressive strength of concrete is* f'_c *=6,000 psi*]

Under the LAR, the licensee also proposed to revise UFSAR Figure 3H.5-3, which is Tier 2* information, by removing the dimension, labelled as 0-inches, in the portion of the figure showing the junction of the basemat and exterior nuclear island wall (along Column Line 1). The 0-inch dimension indicates that vertical reinforcement at this location will be in the same vertical plane (Figure 1 below). The LAR states that removing the dimension does not change the design of the basemat or conformance with the ACI 349-01 code.

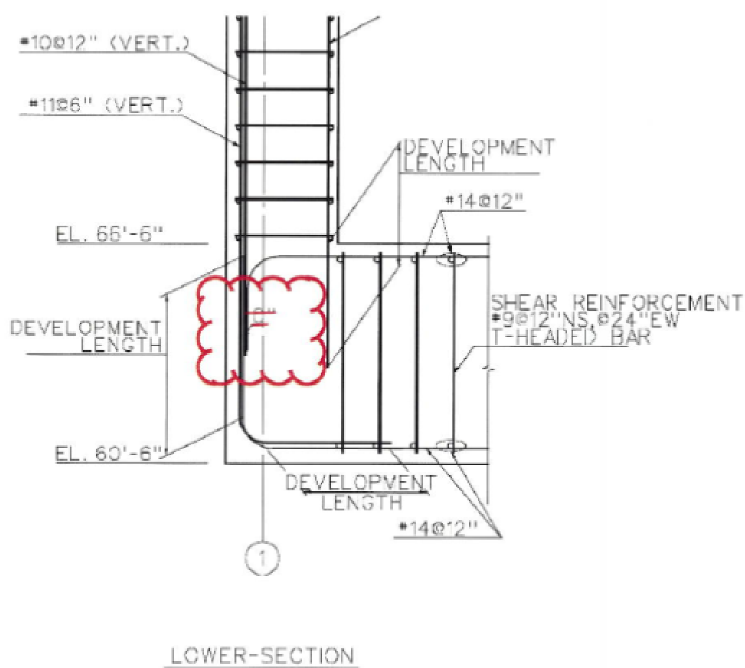

Figure 1. Proposed Revision to UFSAR Figure 3H.5-3

During the review, the staff applied the guidance of Standard Review Plan (SRP) Sections 3.7 and 3.8, as well as relevant regulatory guides, with references to related industry standards and the criteria used to approve the AP1000 DCD, Revision 19, and Vogtle COL application (Revision 5) (ADAMS Accession No. ML11180A100). The staff's technical evaluation of the LAR focused on verifying whether the proposed changes will affect the nuclear island (NI) seismic response, foundation stability, and basemat design. For determining the adequacy of the proposed UFSAR changes, the staff considered the effect of increasing concrete strength and removing a dimension from a critical section detail on (1) compliance with the ACI 349-01 code, (2) seismic response, (3) foundation stability, and (4) structural design of the basemat. The staff's technical evaluation is summarized below.

3.1 Conformance with ACI 349-01 Code Provisions

Concrete materials for the Vogtle site are described in UFSAR Subsection 3.8.4.6.1.1, "Concrete." The concrete compressive strength used in the design of seismic Category I structures and containment internal structures is 4,000 psi. The test age of concrete containing pozzolan, which improves chemical resistance, is 56 days, and the test age of concrete without pozzolan is 28 days. Concrete is batched and placed according to industry standards and ACI 349-01. The staff's evaluation of concrete materials used for seismic Category I structures is described in NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design," dated August 5, 2011(ADAMS Accession No. ML112061231), Section 3.8.

The LAR proposes to increase the concrete compressive strength from 4,000 psi to 5,000 psi for the seismic Category I basemat structure. In LAR Section 3.0, the licensee stated that the increased compressive strength will be accomplished by a small change in the amount of cementitious material and a small change in the ratio of water to cementitious material. The licensee concluded that the 5,000 psi concrete mix conforms to the requirements of ACI 349-01 and ASTM International standards referenced in UFSAR Subsection 3.8.4.6.1.1. The licensee also stated that the use of 5,000 psi concrete mix does not require changes to the processes for mixing, batching, or placing the concrete.

The staff reviewed UFSAR Subsection 3.8.4.6.1.1 and applicable ACI 349-01 code provisions pertaining to concrete quality, mixing, and placing. The staff's review of ACI 349-01 confirms that the code provisions are applicable to concrete materials with compressive strengths greater than 2,500 psi and have some limitations for concrete materials with compressive strengths greater than 10,000 psi. Accordingly, the staff finds the design change from 4,000 psi to 5,000 psi compressive strength is in conformance to code provisions.

3.2 Effect of Increasing Concrete Compressive Strength on Seismic Analysis

The seismic analysis performed for Vogtle Units 3 and 4 is described in UFSAR Section 3.7, Appendix 3G and Appendix 3GG. The seismic design of the AP1000 seismic Category I and seismic Category II structures, systems, equipment, and components is based on the AP1000 certified seismic design response spectra (CSDRS). The CSDRS are based on Regulatory Guide 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants." The guidance covers broadbanded spectra with a peak ground acceleration of 0.3 g. For design purposes, seismic demands are based on the envelope of six soil cases, which include a hard rock site, a soft rock site, a firm rock site, an upper bound soft-to-medium soil site, a soft-to-medium soil site, and a soft soil site.

The seismic model used for performing the AP1000 soil-structure interaction analysis is the SASSI NI-20 model (UFSAR Appendix 3G). SASSI is a soil-structure interaction (SSI) code capable of modeling the seismic response of embedded structures in layered site conditions. The staff's detailed review of this model is described in NUREG-1793, Chapter 3.7.

In UFSAR Appendix 3GG, the licensee describes the site-specific analysis performed to demonstrate applicability of the AP1000 standard design to the Vogtle site. Site-specific analysis was performed to evaluate the exceedance of the site-specific ground motion response spectra of the AP1000 CSDRS. The seismic analysis was based on the site-specific ground motion and the envelope of the best-estimate, lower bound, and upper bound shear-wave velocity profiles. Comparisons at six key nuclear island locations showed that the AP1000 standard plant seismic demands (i.e., based on the CSDRS) envelope the site-specific analysis results except for a narrow frequency range at about 0.55 hertz (Hz) for some locations. The licensee concluded that these narrow low-frequency exceedances had no design consequence since there are no AP1000 structures, systems, or components with resonant frequencies in this range. The staff's detailed review of the licensee's site-specific analysis and justification for exceedances of the AP1000 CSDRS is described in the VEGP Final Safety Evaluation Report (FSER), dated August 5, 2011, Chapter 3.7.

In LAR Section 3, the licensee describes sensitivity SSI analyses performed to assess the change in concrete compressive strength from 4,000 psi to 5,000 psi. The analysis was performed using the SASSI NI-20 model. The licensee modified the SASSI model by changing the modulus of elasticity of the basemat shell elements to reflect the 5,000 psi concrete. The SASSI model considered the Vogtle best-estimate soil profile and site-specific seismic input. The licensee did not identify any departures in seismic analysis methods.

The licensee made comparisons of in-structure response spectra (ISRS) at six key nuclear island locations for both 4,000 psi and 5,000 psi basemat concrete strengths. The results are shown in LAR Enclosure 3. The licensee concluded that, based on the comparisons, the differences in ISRS at the key locations at all frequencies are less than 1 percent.

In addition, the licensee evaluated the exceedances described in UFSAR Subsection 3.7.1.1.1, and found that the change to 5,000 psi concrete does not change or shift the frequency range of exceedences of the ISRS. The licensee found that the difference in ISRS (for 4,000 psi and 5,000 psi concrete) in the frequency range of the exceedance (~0.55 Hz) was less than 0.1 percent.

Based on its review of LAR Enclosure 3, the staff finds the approach for adjusting the NI-20 SASSI model modulus of elasticity is consistent with standard practice and ACI 349-01 Chapter 8.5, and is therefore acceptable. Independent staff calculations indicate that the 25 percent increase in basemat concrete strength corresponds to an increase of frequency of less than 6 percent for out-of-plane flexural response. Staff notes that the +/- 15 percent broadening of ISRS for design, indicated in SRP Section 3.7.2, fully bounds this frequency shift. The staff also reviewed the licensee's sensitivity studies and found that the comparisons indicate minimal differences (less than 10 percent) in ISRS for 4,000 psi and 5,000 psi concrete, for the frequency range of the exceedance (0.55 Hz). In addition, the comparisons all show that the site-specific demands remain bounded by the standard plant design spectra (for frequencies greater than 1 Hz).

Based on the licensee's sensitivity studies, which show minimal differences in seismic response between a 4,000 psi and 5,000 psi concrete basemat, staff concludes that the design change will have negligible effect on the site-specific seismic analysis used to demonstrate suitability of the AP1000 standard plant to the Vogtle site. The staff also concludes that the AP1000 standard plant continues to envelope the Vogtle site-specific seismic demands (for frequencies greater than 1 Hz) and that the proposed design change does not affect the staff conclusions regarding the low-frequency exceedances of the standard plant design spectra.

3.3 Effect of Increasing Concrete Compressive Strength on Sliding and Overturning

The analyses of foundation sliding and overturning for Vogtle Units 3 and 4 are described in UFSAR Subsections 3.8.5.5.3 and 3.8.5.5.4, respectively. The nuclear island basemat is supported on a concrete mudmat (nominally 12-inches thick) with an embedded waterproofing membrane described in UFSAR Subsection 3.8.5.1. Sliding resistance of the basemat is provided by friction forces developed at the various material interfaces (basemat-to-mudmat, mudmat-to-waterproofing membrane, and mudmat-to-soil). A coefficient of friction is assumed to be 0.55 at the basemat-to-mudmat interface. At the interface of the waterproofing membrane and the mudmat, the coefficient of friction is assumed to be 0.7, as described in UFSAR Subsection 3.8.5.1. The governing friction value in the soil below the mudmat has a minimum angle of internal friction of 35 degrees.

While the effect of buoyancy caused by the water table is included in the calculation of sliding resistance, the effect of passive soil pressure is conservatively not included. Factors of safety to resist sliding are shown in UFSAR Table 3.8.5-2 and are based on the envelope of the soil and rock cases described in UFSAR Section 3.7.1. This table indicates the minimum factor of safety to resist sliding under the SSE demands is 1.1.

The analysis of nuclear island overturning considers the effects of nuclear island dead weight, buoyancy, active pressure, and overburden pressure. The effect of passive pressure is not credited in the analysis. Factors of safety to resist overturning are shown in UFSAR Table 3.8.5-2 and are based on the envelope of the standard plant soil and rock cases as well. This table indicates that the minimum factor of safety to resist overturning under SSE demands is 1.17.

The staff evaluation of the sliding and overturning is described in NUREG-1793, Chapter 3.8.

In LAR Section 3, the licensee stated that the seismic sensitivity analysis showed that the change in maximum seismic plus deadweight soil pressure on the soil elements beneath the Vogtle basemat is less than 1 percent. The licensee also stated that there is negligible change in the uplift contact area beneath the Voglte basemat based on the less than 1 percent change in soil pressure and the less than 1 percent change in the ISRS at the six key locations.

Based on its review of LAR Enclosure 3, the staff concludes that the comparisons in ISRS between 4,000 psi and 5,000 psi concrete indicate minimal differences. In addition, the comparisons all show that the site-specific seismic demands remain bounded by the AP1000 standard plant design spectra. Consequently, the staff finds that the Vogtle site-specific factors of safety for sliding and overturning remain bounded by the standard plant factors of safety.

Based on the licensee’s sensitivity studies, which show minimal differences in seismic response between a 4,000 psi and 5,000 psi concrete basemat, the staff concludes that the design change will have negligible effect on factors of safety to resist sliding and overturning of the nuclear island.

3.4 Effect of Increasing Concrete Compressive Strength on Basemat Design

The design and analysis procedures of the AP1000 basemat are described in UFSAR Subsection 3.8.5.4. This section states that the seismic Category I structures are concrete, shear-wall structures consisting of vertical shear and bearing walls and horizontal floor slabs. The walls carry the vertical loads from the structure to the basemat. Lateral loads are transferred to the walls by the roof and floor slabs. The walls then transmit the loads to the basemat and distribute the foundation loads between them.

The design of the basemat consists primarily of applying the design loads to the structures, calculating shears and moments in the basemat, and determining the required reinforcement. UFSAR Subsection 3.8.4.2 states that the design, materials, fabrication, construction, inspection, and testing of the basemat foundation are in accordance with ACI 349-01.

In LAR Section 3, the licensee stated that, based on sensitivity studies, the change in specified concrete strength will not have an adverse impact on the strength of the basemat or the response of basemat to loads, including seismic loads, from the nuclear island structures supported by the basemat. The licensee concluded that the evaluation of the basemat showed that there was a minimal change in the stresses in the basemat and that these were more than offset by the increase in shear strength of the concrete.

The licensee also stated that the percent change in the average seismic membrane plus bending stress in the Vogtle basemat compared to the AP1000 generic average seismic membrane and bending stresses is approximately 3.3 percent. The licensee concluded that, despite the small differences in basemat stresses (for 4,000 psi and 5,000 psi concrete), the design remains enveloped by the standard plant. The Vogtle 4,000 psi and 5,000 psi basemat average seismic membrane and bending stresses are 57.2 and 60.5 percent of the corresponding AP1000 generic maximum stresses, respectively.

Based on its review of LAR Enclosure 3, the staff concludes that the comparisons in ISRS between 4,000 psi and 5,000 psi concrete indicate minimal differences and would result in minimal increases in seismic demands and basemat member forces. Staff notes that the 25 percent increase in concrete strength corresponds to an approximately 12 percent increase in shear strength of the concrete (ACI 349-01, Chapter 11.3). In addition, the Enclosure 3 ISRS comparisons all show that the site-specific demands remain bounded by the standard plant design spectra. Consequently, staff finds that the design of the basemat remains bounded by the standard plant.

Based on the licensee's sensitivity analysis, which indicates minimal differences in seismic response and basemat stresses and margin to the AP1000 standard design, the staff concludes that the design change from 4,000 psi to 5,000 psi concrete strength will not result in changes to required steel reinforcement.

3.5 Effect of Dimension Change in Critical Section Detail

UFSAR Section 3H.5, "Structural Design of Critical Connections," describes the structural design of AP1000 critical connections. Critical section (1) is described as the South wall of the Auxiliary Building (Column Line 1), elevation 66-feet, 6-inches to elevation 180-feet, 0-inches. UFSAR Subsection 3H.5.1.1 states that the exterior wall along Column Line 1 illustrates typical loads such as soil pressure, surcharge, temperature gradients, seismic, and tornado. UFSAR Figure 3H.5-3 provides additional design detail for this connection.

In LAR Section 3, the licensee proposed to revise UFSAR Figure 3H.5-3 to remove the dimension labeled 0-inches in the portion of the figure showing the basemat below the wall. This section also states that the particular dimension is being removed for the Vogtle design, as the hook-end and vertical wall reinforcement will not be aligned in the same vertical plane. The licensee concluded that the design revision does not change the design of the basemat longitudinal or shear reinforcement.

The staff performed a review of the proposed change to UFSAR Figure 3H.5-3, and it concludes that the removal of the dimension labeled as 0-inches does not reduce the capacity of the basemat to exterior wall joint or conflict with ACI 349 code provisions. Accordingly, the staff concludes that the design revision has no impact on the design of the basemat.

Conclusion

The NRC staff has reviewed the licensee's analysis provided in Section 3 of its submittal dated August 1, 2012. Based on the staff's technical evaluation, the staff concludes that:

1. The proposed increase in compressive strength of the basemat from 4,000 psi (27.6 MPa) to 5,000 psi (34.5 MPa) conforms to ACI 349-01 code provisions.

2. The proposed increase in basemat concrete strength will have a negligible effect on the site-specific seismic analysis used to demonstrate suitability of the AP1000 standard plant to the Vogtle site.

3. The AP1000 standard plant continues to envelope the Vogtle site-specific seismic demands (for frequencies greater than 1 Hz), and the proposed basemat design changes do not affect the staff conclusions regarding the low-frequency exceedances above the standard plant design.

4. The proposed increase in basemat concrete strength will result in only a negligible effect on factors-of-safety to resist sliding and overturning of the AP1000 nuclear island.

5. The proposed increase in basemat concrete strength will have minimal increase in seismic demands on the basemat. In addition, the comparisons show that the site-specific demands remain bounded by the standard plant design spectra. Consequently, the staff finds that the design of the basemat remains bounded by the standard plant design.

6. The removal of the dimension labeled as 0-inches in Tier 2* Figure 3H.5-3 does not affect the ability of the critical section joint to perform its function under design-basis demands or conflict with ACI 349-01 code provisions. Accordingly, the staff concludes the design revision has no impact on the design of the basemat.

For the reasons specified above, the staff finds the proposed UFSAR amendments to increase concrete compressive strength and remove a detail dimension do not affect analysis results and related conclusions presented in the AP1000 DCD and VEGP COL FSAR related to concrete materials, seismic analysis, foundation stability, and basemat design. Consequently, the NRC staff concludes that there is reasonable assurance that the requirements of Appendix A to 10 CFR Part 50, Appendix S to 10 CFR Part 50, and Appendix D (Section VIII B6) to 10 CFR Part 52 will continue to be met. Therefore, the staff finds the proposed changes acceptable.

4.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION

The NRC's regulations in 10 CFR 50.92, "Issuance of Amendment," state that the NRC may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility, in accordance with the amendment, would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated, or (2) create the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in a margin of safety. The Commission previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment of such finding (77 FR 50538, dated August 21, 2012).

As required by 10 CFR 50.91(a), the NRC staff presents an evaluation of the issue of no significant hazards consideration as follows:

Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The design function of the basemat is to provide the interface between the nuclear island structures and the supporting soil. The basemat transfers the load of nuclear island structures to the supporting soil. The basemat transmits seismic motions from the supporting soil to the nuclear island.

The change to the concrete and rebar details for the basemat does not have an adverse impact on the response of the basemat and nuclear island structures to SSE ground motions or loads caused by anticipated transients or postulated accident conditions because there is not an adverse change to the seismic floor response spectra and postulated accidents are not affected by seismic motions. The change to the concrete and rebar details for the basemat does not affect the support, design, or operation of mechanical and fluid systems because the change in the loads on these systems caused by seismic motions is negligible. There is no change to the design of plant systems or the response of systems to anticipated transients and postulated accident conditions. The basemat supports the structures and the mechanical system and component supports. There is no change to this function. Because the change to the concrete and rebar details does not change the response of systems to postulated accident conditions and is unrelated to any accident source term parameters, there is no change to the predicted radioactive releases caused by postulated accident conditions.

Therefore, there is no change to the consequences of an accident before or after implementation of the proposed amendment. The plant response to previously evaluated accidents or external events is not adversely affected, nor does the change described create any new accident precursors. Therefore, there is no difference between the probability of a seismically induced event before or after the implementation of the proposed amendment. The concrete specified compressive strength and 0-inch dimension are not parameters considered as an initiator for any accident previously evaluated. Therefore, there is no difference in the probability or consequences of a seismically induced event before or after implementation of the proposed amendment. Based on the considerations outlined above, there is no significant increase in the probability or consequences of an accident previously evaluated.

Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change is an increase in the concrete specified compressive strength for the basemat and a change in the reinforcement details. The change to the concrete and rebar details does not change the design function of the basemat or nuclear island structures. The change to the concrete and rebar details does not change the design function, support, design, or operation of mechanical and fluid systems. Because the basemat will be designed to the ACI codes specified in the UFSAR and the concrete will be specified, mixed, batched, and placed to the same codes and standards specified in the UFSAR, the change to the concrete and rebar details does not result in a new failure mechanism for the basemat or new accident precursors. As a result, the design function of the basemat is not adversely affected by the proposed change. Therefore, the proposed change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

The margin of safety for the design of the seismic Category I structures, including the basemat, is determined by the use of the ACI 349 code and the analyses of the structures required by the UFSAR. The change to the concrete and rebar details does not have an adverse impact on the strength of the basemat. The change to the concrete and rebar details does not have an adverse impact on the seismic design spectra or the structural analysis of the basemat or other nuclear island structures. The change to the concrete and rebar details does not significantly impact the analysis requirements or results for the nuclear island for bearing, settlement, construction sequence, sliding, or overturning because there is no change in the analysis assumptions for density, weight, friction, or seismic motions caused by the increase in the concrete specified compressive strength. There is no increase in the portions of the basemat subject to predicted lift-off (zero contact force) during seismic motions analyzed for the SSE. There is minimal change to soil pressures on the basemat caused by the change in stiffness of the basemat. As a result, the design function of the basemat is not adversely affected by the proposed change. Therefore, the proposed change will not involve a significant reduction in a margin of safety.

Based on the above evaluation, the NRC staff concludes that the three standards of 10 CFR 50.92(c) are satisfied. Therefore, the NRC staff has made a final determination that no significant hazards consideration is involved for the proposed amendment and that the amendment should be issued consistent with 10 CFR 50.92, “Issuance of Amendment.”

5.0 STATE CONSULTATION

In accordance with the Commission’s regulations 10 CFR 50.91(b), the Georgia State official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, “Standards for Protection Against Radiation.” The NRC staff has determined that the amendment involves no significant change in the types or significant increase in the amounts of any effluents that may be released off site, and that there is no significant increase in individual or cumulative occupational radiation exposure. As described above in Section 4.0 of this safety evaluation, the NRC staff has found that the amendment involves no significant hazards consideration. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission’s regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

8.0 REFERENCES

American Concrete Institute, “Code Requirements for Nuclear Safety-Related Concrete Structures,” ACI 349-01, January 1, 2001, Farmington Hills, MI.

Pierce, C.R., Southern Nuclear Operating Company, letter to U.S. Nuclear Regulatory Commission, August 1, 2012, Agencywide Documents Access and Management System (ADAMS) Accession No. ML12215A084.

U.S. Nuclear Regulatory Commission, AP1000 Design Certification Document, Revision 19, June 13, 2012, ADAMS Accession No. ML11171A087.

U.S. Nuclear Regulatory Commission, “Final Safety Evaluation Report Related to Certification of the AP1000 Standard Plant Design,” NUREG-1793, Supplement 2, September 2011, ADAMS Accession No. ML112061231.

U.S. Nuclear Regulatory Commission, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition,” NUREG-0800, June 1987, ADAMS Accession No. ML052340534.

U.S. Nuclear Regulatory Commission, Vogtle Electric Generating Plant Updated Final Safety Analysis Report, Revision 1, June 25 2012.

Vogtle Electric Generating Plant, Final Safety Evaluation Report (FSER), August 5, 2011 (ADAMS Accession No. ML111950510 (letter) and Accession No. ML110450302 (FSER package).